MICROWAVE CHARACTERIZATION OF THIOBENZALDEHYDE AND OTHER PRODUCTS IN THE DISCHARGE OF BENZENE WITH SULFUR ADDITIVES

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Although many organo-sulfur species have been detected in molecular clouds and star-forming regions, they are insufficient to account for the expected sulfur content. In an attempt to identify new potential sulfur reservoirs, we have studied the discharge of benzene with both H_2S and CS_2. Thiobenzaldehyde is the first species we have characterized at high resolution using chirped pulse and cavity enhanced microwave spectroscopy in the 2-40 GHz region. Production of thiobenzaldehyde was particularly prominent in the discharge of benzene with carbon disulfide. Isotopic substitution with $^{13}CS_2$ indicates a relatively simple formation pathway for thiobenzaldehyde, initiated by attack of the benzene ring by ^{13}CS followed by an H-atom shift from the benzene ring. Although much weaker, observation of thiobenzaldehyde in the discharge of benzene with H_2S suggests that other pathways may be relevant.